BLM LIBRARY
88081455

POWDER RIVER

TRACT PROFILE
COAL CREEK TRACT, MONTANA

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

#54791535 ID: 88081455

HD
242.3
.P6936

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

COAL CREEK

TRACT PROFILE INTRODUCTION

Background

In July 1979, the BLM, Miles City District Office completed the Powder River Resource Area update for portions of Powder River, Custer, Big Horn, Treasure and Rosebud Counties. The land use planning process included applying unsuitability criteria, multiple-use conflict evaluation, and surface owner consultations. As a result of that work, areas were identified that could be further considered for coal development. The areas are available for consideration for new competitive leasing, leasing by exchanging and modifying existing leases.

Following land-use planning the BLM requested expression of interest which, along with other information, guided the CS in delineating this tract. Results of that work are summarized in this profile.

Personnel from BLM, Miles City District inventoried the tract to determine the site specific resource values and then analyzed potential environmental effects of coal development on this individual tract. Among other items, the unsuitability criteria (43 CFR 3461) were reconsidered on this site-specific basis. Any new findings of unsuitability are reflected in the delineation and development proposal of the tract described in this profile.

To be further considered for new competitive leasing, the tract will be presented to the Regional Coal Team which guides and reviews tract ranking and selection and sale scheduling procedures that develop alternatives which would analyze the regional environmental impact statement (EIS). The EIS would analyze the site-specific and regional cumulative effects of coal leasing and development. Alternatives addressed in the EIS would include different combinations of tracts that meet a regional coal leasing target. The analysis of those groups of tracts would result in different impacts than the assessment made in this document for this specific tract. During the process this preliminary tract could be modified. Ultimately, the Secretary will select specific tracts for lease sale. If the tract is leased, the lessee would be required to submit a plan for mining and reclamation (M&R) to the Secretary of Interior, Office of Surface Mining (OSM) for review and approval within 3 years after leasing. Once a mining plan has been submitted, OSM would review the proposed developments of the mining plan. OSM would prepare a site-specific environmental assessment or EIS prior to approval of the mine plan.

Development of the tract is in accordance with the Federal Coal Management Program adopted by the Secretary, Department of the Interior, in June 1979. Basis of the program was, in part, the Final Environmental Statement for the Federal Coal Management Program. Implementation procedures are contained in

Title 43 - Code of Federal Regulations - Part 3400 (43 CFR 3400). Authorizing actions are The Mineral Leasing Act of 1920, as amended; The Mineral Leasing Act for Acquired Lands of 1947, as amended; the Federal Land Policy and Management Act of 1976; the Surface Mining Control and Reclamation Act of 1977; the Multiple Mineral Development Act of 1954; the Department of Energy Organization Act of 1977; the National Environmental Policy Act of 1969; the Federal Coal Leasing Amendments Act of 1976, as amended; the Act of October 30, 1978, and Federal Regulations concerning federal coal leasing and development including 43 CFR 3400; 30 CFR 211; and 30 CFR 700-899.

In adopting the coal program, the Secretary established a tentative competitive coal leasing target of 1.1 billion tons for 1982 in the Powder River Region of Wyoming and Montana. Subsequent sales would then follow on a 2-to 4-year cycle.

Purpose and Need for Action

Purpose of the action is to offer strippable federal coal reserves that can be further considered for coal leasing and development to help meet the energy needs of the nation.

This tract profile contains a summary of the tract delineation report and a site-specific analysis (SSA). The United States Department of the Interior, Geological Survey (GS) delineated the tract while the Bureau of Land Management (BLM) completed the site-specific environmental inventory and preliminary analysis.

Tract Delineation Report Summary

Tract Name: Coal Creek State: Montana

The Coal tract is located in the center of the northern Powder River Basin, Rosebud and Powder River Counties, Montana. The tract contains two recoverable coal beds, the Knobloch and Sawyer, which are present in two seams.

The coal deposit occurs in the top part of the Fort Union Formation (Paleocene), which comprises approximately 3,000 feet of sandstones, shales, siltstones, and coal seams. The formation occurs in nearly flat-lying beds. The coal is subbituminous in rank and weighs 1,770 tons per acre-foot. There are no known geologic hazards to surface mining in the Ashland tract. See the tract profile summary for the salient geologic data for the tract.

The generic mining plan calls for a surface mine using draglines, electric shovels, dump trucks, loaders, scrapers, and other support equipment. The coal would thus be mined to a depth of 200 feet or until the limiting stripping ratio (6:1) has been reached. The plan indicates that the coal would be shipped by railroad to an electrical utility out of the Powder River Region.

Tract Profile Summary

Coal Creek

Coal Data		Proposed Action
Total Reserves (Million Tons Strippable)		182
Recoverable Reserves (Million Tons)		federal 60 (total 164)
Average Coal Thickness (Ft.)		Knobloch Seam 50 Sawyer Seam 10
Average Overburden (Ft.)		150
Coal Rank		subbituminous
Percent Recovery		90
Proximate Coal Analysis		
Percent Moisture	32.25	30
Percent Ash	9.6	4.91
Percent Sulfur	.35	.14
BTUs Per Pound	7,915	8,246
Mine Life (Years)	4,1	
Annual Production Rate (Million Tons)	3,346	
Tract Area (Acres)		
Surface Mine/Truck Shovel Operation		
Employment		
Construction		98
Mine Operation		123
Environmental Data		
Water Requirements		56 acre-feet/year.
Transportation, Land Use, VRM, Vegetation		Moderate during mining; low after mining.
Soils		High to Moderate.
Reclamation		Low, if successful.
Wildlife		Moderate loss of habitat.
Noise, Air Quality		High during mining, low after successful reclamation.
Agriculture		Moderate during mining; low after successful reclamation.

SITE SPECIFIC ANALYSIS
COAL CREEK

INTRODUCTION

A. PURPOSE AND NEED

The purpose of this analysis is to comply with the Secretary of Interior's decision that a sufficient number of tracts be delineated and selected for sale from the areas designated in land use plans as acceptable for further consideration for leasing to meet the regional leasing target. As a result of the 1979 Powder River Management Framework Plan (MFP) Update, federal coal in this tract was identified for further consideration for development through competitive leasing.

It should be noted that the acreage and legal description of federal coal discussed in this Site Specific Analysis is limited to those areas that have been included in the comprehensive land-use plan, in accordance with Section 3(a)(i) of the Federal Coal Leasing Amendments Act of 1976 and the decision of the U.S. Secretary of Interor June 2, 1979, that the coal to be selected for sale comes "from the areas designated in land-use plans as acceptable for further consideration" (page 60 of Volume I of the Secretarial Issue Document).

I. ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

A. NO ACTION ALTERNATIVE

Under the no action alternative, federal coal would not be leased. Because of the "checkerboard" ownership patterns, development would not occur on this tract. Approximately 164 million tons of coal, recoverable by existing methods, would not be mined. It should be noted that mining of fee coal will take place in the nearby area with attendant growth and development to occur.

B. PREFERRED ALTERNATIVE

The proposed action is to offer for competitive leasing a 3,346-acre tract of land in western Powder River County and eastern Rosebud County, containing 164 million tons of recoverable coal. The tract comprises an area identified by the U.S. Geological Survey as an economical mining unit for development of a 40-year strip mining operation. The tract is located one mile east of Ashland and north of U.S. Highway 212. See Map 1 for location and legal description.

The mining operation would have an annual production of 4.1 million tons and would employ 98 persons during construction and 123 persons during production. The tract is composed of 60 million tons of federal coal, 93 million tons of fee (private) coal and 11 million tons of state coal. Surface disturbance would be approximately 48 acres a year. Total disturbed area would be 1,920 acres from mining and 227 acres from facilities and haul roads.

For more specific information on the proposed mining operation, refer to the Engineering Report prepared by the U.S. Geological Survey.

The proposed action assumes that proper mining and reclamation will be carried out according to existing state and federal regulations. These include: Office of Surface Mining Reclamation and Enforcement (OSM) regulations (30 CFR 700-899), Environmental Protection Agency (EPA) regulations (40 CFR 0-1399), Department of the Interior's coal management program regulations (43 CFR 23 and 3400 and 30 CFR 211), and regulations of the Montana Department of State Lands.

II. AFFECTED ENVIRONMENT

The environment that currently exists and changes anticipated from ongoing trends are included in this section. Information is presented within the time frame of the proposed action including the alternatives, and is restricted to that information required to assess significant impacts.

A. TOPOGRAPHY

Most of the area consists of flat to gently rolling ridges or uplands. Erosion along the edges of the uplands has occasionally formed steep-sided gullies or coulees. A dendritic drainage pattern exists that flows generally south and east into Otter Creek. Elevations range from 3,040 feet to 3,406 feet above sea level.

B. GEOLOGY

The area is underlain by sandstone, shale, clinker, and coal belonging to the Tongue River Member of the Fort Union Formation (Paleocene). Recoverable coal reserves within the EMU have been established at 164 million tons. The coal is present in two seams, the Sawyer and Knobloch, that are separated by 150 to 200 feet of interburden.

C. PALEONTOLOGY

Known paleontological resources in the area consist of poorly silicified tree fragments, leaf impressions, and pieces of unidentified calcareous shells. Fossils possessing exceptional scientific value are not known to occur in the tract.

D. SOILS

Soils within the tract are formed in sandstone, shale and alluvial deposits. The soils occur along rolling uplands and steep-sided gullies. The underlying bedrock characteristics are closely reflected in the soils, since they are not well-developed and loamy textures predominate.

There are 22 soil series in the tract, surveyed by the Soil Conservation Service at level two and level three. The soils discussed are listed in Table 2-1.

E. WATER RESOURCES

1. Ground Water

Ground water characteristics in the tract are typical for the Otter Creek Coal area. Two stock wells are in use in the tract. The Knobloch coal seam is a main source of water. It is

saturated in the tract and is preliminarily estimated to flow at 5,000 cu ft/day in the direction of the topography toward Otter, Home, and Threemile Creeks (EMRIA 1975). The Sawyer coal seam is dry. Total dissolved solids (TDS) concentration or salinity in the tract is unknown but averages about 2,500 milligrams per liter (mg/L) in the area.

2. Surface Water

No major creeks flow through the tract. However, Cook, East Fork Otter and Otter Creek are in the vicinity. Cook Creek drains most of the tract. It is spring-fed, but flows mostly in response to storm events. It empties directly into the Tongue River. Water from the southeast portion of the tract flows into East Fork Otter Creek, which usually flows for part of the year. Sediment yield in the vicinity varies from 0-0.2 acre-feet per square mile per year (ac ft/sq mi/yr) for bottomlands to 0.8-1.2 for hillslopes (EMRIA 1975).

3. Alluvial Valley Floors and Flood Plains

No flood plains or alluvial valley floors (AVF's) were defined to be over public minerals in the tract. However, a flood plain and a potential AVF along Otter Creek, west of the tract, have been identified.

F. VEGETATION

The Coal Creek Economical Mining Unit (EMU) is made up of one major vegetative rangeland type (Payne 1973), which is the ponderosa pine savannah (See Regional paper, unpublished manuscript in Miles City District Office of BLM). The area included in the vegetative type consists of: (a) grassland - 1,331 acres, (b) sagebrush-grassland - 916 acres, (c) ponderosa pine - 462 acres, (d) Other - 637 acres. Within this vegetative type, there are varying range sites with varying production yields (pounds per acre) and condition classifications. There are approximately 606 AUMs being produced per year on the tract.

G. LAND RESOURCES

1. Agriculture

Agriculture operations in this area are mainly livestock, hay (alfalfa or grass-legume) and some small grains. The bottomlands are flood-irrigated during spring runoff then sub-irrigated for the balance of the growing season. The water in Otter Creek is too high in salts and alkalinity for irrigation the rest of the growing season. Alfalfa, grass-legume hay or

small grains (oats or barley) are crops raised to feed the livestock in the winter months. Approximately 19 percent of the tract, which is Class III and IV land, is currently being used as cropland. In addition, there are approximately 486 acres of Class III and IV privately-owned land (14.5 percent of the tract) that are suitable for cropping, but not presently cropped.

Approximately 464 acres could produce approximately 1,035 tons of alfalfa and support 232 AUMs or produce 9,493 bushels of winter wheat per year and have 22 acres suitable for tame pasture, which could provide 15 AUMs.

The State of Montana owns about one acre of Class III land (<.1 percent of the tract) that is suitable for cropland, but is not presently being cropped. This land could produce one ton of alfalfa and support <1 AUM or produce 18 bushels of winter wheat.

2. Recreation

The tract is relatively isolated from recreational use or demand and there are no recreational developments in or near the area. Some very limited hunting use may occur, but any other recreation activity is quite unlikely, especially since the area is adjacent to the Custer National Forest where opportunities are better. Since no public access exists, any use of the tract for recreation would require landowner permission. This restriction, along with remoteness from population centers, effectively prohibits recreational use. The area contains no wilderness potential.

3. Other Land Uses

The land within the tract is used solely for ranching. There are no industrial activities. Existing roads are dirt and receive low use and maintenance. There is no rail service at present, however, the Tongue River Railroad Company proposes to construct a railroad to run from Birney, to Miles City, Montana, where it would connect with Burlington Northern tracks. The new mine would also require a 2-mile spur to be built to the Coal Creek tract. The route is not final and several alternatives have been proposed. If approved, construction would begin in 1982 with completion scheduled in 1984.

small grains (oats or barley) are crops raised to feed the livestock in the winter months. Approximately 13 percent of the tract, which is Class III and IV land, is currently being used as cropland. In addition, there are approximately 486 acres of Class III and IV privately-owned land (14.3 percent of the tract) that are suitable for cropping, but not presently cropped.

Approximately 486 acres could produce approximately 1,023 tons of alfalfa and support 232 AUMs or produce 3,493 bushels of winter wheat per year and have 21 acres suitable for farm pasture, which could provide 15 AUMs.

The State of Montana owns about one acre of Class III land (<.1 percent of the tract) that is suitable for cropland, but is not presently being cropped. This land could produce one ton of alfalfa and support <1 AUM or produce 16 bushels of winter wheat.

2. Recreation

The tract is relatively isolated from recreational use or demand and there are no recreational developments in or near the area. Some very limited hunting use may occur, but any other recreation activity is quite unlikely, especially since the area is adjacent to the Custer National Forest where opportunities are better. Since no public access exists, any use of the tract for recreation would require landowner permission. This restriction, along with remoteness from population centers, effectively prohibits recreational use. The area contains no wilderness potential.

3. Other land uses

The land within the tract is used solely for ranching. There are no industrial activities. Existing roads are dirt and receive low use and maintenance. There is no rail service at present, however, the Tongue River Railroad Company proposes to construct a railroad to run from Sidney, to Miles City, Montana, where it would connect with Burlington Northern tracks. The new line would also require a 3-mile spur to be built to the Coal Creek tract. The route is not final and several alternatives have been proposed. If approved, construction would begin in 1982 with completion scheduled in 1984.

H. WILDLIFE

The Coal Creek EMU supports a wide variety of wildlife. Interspersed with the area's three main vegetative types are shrub species important to wildlife such as skunkbrush (Rhus trilobata), and snowberry (Symphoricarpos spp.).

One sharp-tailed grouse arena occurs within the tract, located over federal minerals. Attendance at the arena was 24, males during 1980 while average male attendance at all arenas in a 92-square-mile area was 17.8. This arena and a buffer zone around it was excluded with the stipulation that leasing could occur if mining would not disturb a significant portion of the nesting habitat and reclamation would provide suitable post-mining habitat.

Mule deer use occurs in all of the tract with summer densities of about 2.0 deer/square mile. Winter use of the EMU appears to be minimal as the preferred medium to steep slope areas do not occur on the tract.

Predominant antelope use is on the sagebrush-grassland, dissected midslopes with light summer use (8 to 12 animals) occuring throughout the tract. Winter use by up to 40 antelope occurred in sections 8 and 9, T.3S., R.45E. during the mild 1979-1980 winter. On normal winters, this use would probably be less as this area is not considered to be optimum winter range.

One golden eagle nest has been identified immediately adjacent to the EMU in the SE1/4, section 18, T.3S., R.45E. No exclusion was made as the adjacent section 17 is private minerals.

The bald eagle has been observed as a migrant in the area. No other threatened or endangered species occur.

State of Montana species of special interest or concern identified in the EMU are the Swainson's hawk, Cooper's hawk, upland sandpiper, mountain bluebird, clay-colored sparrow, Brewer's sparrow and field sparrow.

I. CULTURAL RESOURCES

Within the Coal Creek tract, 1,033 acres (100%) over federal coal (29% of federal coal acreage) have been intensively inventoried in two surveys contracted by BLM (Bryant, Rollefson and Gehr 1980). (See Map 2.) The surveys located three prehistoric lithic scatters,

one historic site consisting of buildings and machinery and 18 isolated artifacts. Three of the sites have been recommended eligible for the national Register of Historic Places, in consultation with the Montana State Historic Preservation Officer. One site is of undetermined eligibility due to landowner refusal to return and fully record the sites after they were located. BLM is seeking determinations of eligibility from the Keeper of the National Register regarding the two sites belived to be eligible.

Present impacts to cultural resources derive principally from rodent disturbance, grazing activity, frost heaving and erosion. Projected site density for the Ashland (Coalwood) tract is 4.5 $\pm$ 1.15 sites per square mile. This remains the most reliable estimate because of limited site totals within the tract. There is a 30% probability of locating additional National Register eligible sites, based on present information.

J. VISUAL RESOURCE MANAGEMENT

The tract is located in an area used exclusively for ranching. The only current intrusions are those activities associated with the ranching operations and 1/2 mile of U.S. 212, which crosses a corner of the tract. Because of the rural nature, scenic quality is fairly good with low mountains, forested hills and some breaks in the area. This area contains scenic quality categorized as roughly equal classes B and C with nearly equal segments of common and unique physiographic and vegetative characteristics.

K. ECONOMICS

Present employment in the affected areas of Colstrip and Forsyth in Rosebud County and Broadus in Powder River County is approximately 1883 energy workers. New workers, including both construction and operational employees at Western Energy Co., Peabody Coal and MONTCO mines, the increased railroad activity and Colstrip 3 and 4 power plants, will increase 1983 energy-related employment in Rosebud County by 2,152 workers. About 679 jobs in secondary sectors in Rosebud County would form during the same time period largely as a response to the new primary jobs.

By 1987 energy-related employment drops in Rosebud County by 2,027 workers due to the withdrawal of construction work forces from Colstrip 3 and 4 and the MONTCO mine partially offset by small gains in mining and power plant operating work forces. This decrease in primary employment would lead to a drop in total employment in

Rosebud County of 1,360 jobs. (Some growth in secondary employment between 1983 and 1987 would occur due to long term changes in the composition of the economy.)

L. SOCIOLOGY

1. Population

The 1980 population of Ashland is 569, up from 400 in 1970 (U.S. Bureau of the Census, 1980; Department of Energy, 1979). This can be represented as a 3.53% rate of annual increase.[1]

With the opening of the MONTCO mine in 1982, and with the assuption that all the mine and secondary employees will stay in Ashland, the population changes are shown in Table 2-2. There are several other assumptions made in these population figures. First, construction workers will come from outside the area, while 50% of the operating workers will be local hires (See Murdock and Leistritz 1979; Leistritz, Murdock, and Leholm 1980). Also, the population to employment multiplier used for the construction work force is 1.2 while it is 1.65 for operational workers (Murdock and Leistritz; Murdock 1980).

Overall, Ashland has the potential of a 115% increase in population between 1980 and 1990 due to projected growth and the MONTCO mine.

[1]The annual rate of increase is calculated by:

$$r = \frac{\log \frac{Pn}{Po}}{n \log e}$$

where:

- r = rate of natural increase
- P_n = 1980 population
- P_o = 1970 population
- n = time interval $P_n - P_o$
- e = base of the natural logarithms

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

Table 2-2

Population of Ashland From Projected Growth and the MONTCO Mine, 1980-1990

Year	Additional Population from Projected Growth[a]	Additional Population Due to MONTCO Mine	Total Population
1980			569
1981	20		589
1982	21	47	657
1983	21	527	1,205
1984	23	-46	1,182
1985	23	-395	810
1986	24	No Change	834
1987	24	25	883
1988	26	162[b]	1,071
1989	27	99	1,197
1990	27	No Change	1,224

[a] calculated using the geometric growth curve

$$P_n = (1+r)^n$$

where:

P_n = future population
P_o = base population
r = rate of natural increase
n = time interval, in years

[b] includes 83 secondary jobs with a population to employment multiplier 1.65

2. Community Services

The level of service availability in Ashland and Rosebud County is most likely the same as described in Department of Energy (1979), McQuiston (1979), Williams (1975) and Bureau of Land Management (1979).

3. Ashland as a Community

The community structure of Ashland is fairly typical of rural communities. It is characterized by generally informal relations, little bureaucratization of social life, and a well established system of roles and statuses in the community (Hillery 1968, Cortese 1980).

Ashland can also be seen as an independent community. That is, a community that is small in population, isolated, has a simple technology, and has a marked stability (Hawley 1950). This type of community structure has led to a great emphasis on local self-sufficiency and a distrust of governmental and other agencies outside the area (Murdock and Leistritz 1979).

4. Attitudes

Overall, most residents in the Powder River area favor coal development (BLM 1980). This favorability, however, is not unconditioned; if it is felt that the nation does not need the coal to ease the national energy problems or that reclamation is not possible or not planned, favorability towards coal development would be greatly reduced.

Also associated with attitudes towards coal development are desires to see some controls on development. The controls are of two types: environmental and governmental. Environmental controls are centered around reclamation and concern for water supply and quality. The governmental controls are unspecified, but a strong feeling exists that some level or levels of government should exercise some controlling authority over development. Stated in another way, it is felt that mining companies should not have a free hand in the development of coal.

With respect to whether people were more concerned with environmental or social impacts, the responses were evenly split.

M. AIR QUALITY AND NOISE

Noises and odors are of a natural origin except for some influence from vehicles and farm machinery.

CHAPTER III ENVIRONMENTAL CONSEQUENCES

This section describes the significant environmental effects that would occur with implementation of the proposed action including the alternatives. Such items as threatened and endangered plant and animal species, floodplains and wetlands, and wilderness values have been considered and are discussed as appropriate. Also, negative declarations included in the matrices are not presented within the impact descriptions in this section. Principal basis for the analysis is the professional judgments of the resource specialists, public and other agency input, and related works, as referenced.

I. NO ACTION ALTERNATIVE

The no action alternative would result in no disruption of the natural land surface.

Under the no action alternative, about 164 million tons of coal would not be recovered. Three levels of government participate in mining through their taxing power. The federal government's royalty of (at least) 12.5% of the mine-mouth sales price of the coal would, at $10 per ton and 1,500,000 tons of federal coal per year yield an annual tax harvest of about $1,875,000, half of which ($938,000) would be rebated to the state. The State of Montana severance tax of 30% is applied not to the sales price but to the sales price less some production-based tables -- the Contract Sales Price (CSP). The CSP is a function of a complex formula, however, generally the severance tax is about 22% of the mine-mouth sales price. The Coal Creek EMU, producing 4.1 million tons per year at $10 per ton, would generate about $9,020,000 of annual severance taxes. County and school assessed value equals 45% of the contract sales price or, at $10 per ton mine-mouth sales price, $4.50 per ton. Powder River County 1977 mill levies, including schools, averaged 81.73 mills. The Coal Creek EMU, producing 4.1 million tons, would at that rate generate about $1,508,000 in gross proceeds taxes for the county and schools (36.8¢ per ton = $4.50 x .08173).

Under the no action alternative, the paleontological resorce would remain undisturbed. However, the potential for exposure and study of unearthed fossils would be lost.

If mining does not occur, none of the impacts related to this tract will be experienced.

II. PROPOSED ACTION

A. TOPOGRAPHY

The natural variety of landforms now displayed within the area would be reduced by mining. Slopes, out of necessity to abate erosion, would be reduced. Changing the natural erosional patterns will increase the rates of the area's sediment yield until such time that natural vegetation can be reestablished.

B. GEOLOGY

The major impact of the proposed action would be the removal of about 164 million tons of coal.

C. PALEONTOLOGY

Fossils may be destroyed during the mining process. However, surface disturbance may unearth fossils that could be collected and studies made of specimens that would have otherwise remained buried.

D. SOILS AND RECLAIMABILITY

The proposed action would have a significant impact on the soil in the tract (see Table 2-1). By the end of mine life, 3,346 surface acres would be disturbed, including 160 acres used for facilities. Soil impacts include: displacement of soil from wind and water erosion, change in soil structure and natural fertility, soil compaction from haul roads, and significant problems in revegetation and stabilization on steep slopes.

In the tract, there is a low potential displacement of soil by wind erosion of 78 percent and a moderate potential displacement of soil by water erosion of 73 percent (see Table 2-1). Proper seeding of the stockpiles would reduce this.

Disturbances of the soil would result in alterations of soil structure and porosity. This alteration would affect permeability, infiltration rates, soil-air and soil-water relationships and bulk density. The natural fertility would be affected by disruption of the nutrient cycle and a decrease in organic matter content within the soil. Salinity content would increase as a result of the lower calcareous horizons being brought to the surface.

The soil reconstruction potential is derived from the National Soils Handbook (USDA). The soil hazard conditions determine the reconstruction potential. The tract is rated as four percent good, two percent fair and 94 percent poor for reconstruction. Suitability of the soil material for plant growth is rated as five percent good, 20 percent fair, 32 percent poor and 43 percent unsuitable (see Table 2-1). The soils rated poor can be reclaimed, but would require more intensive and costly management to be revegetated and stabilized.

E. WATER RESOURCES

1. Ground Water

The primary effect of mining on ground water is on well water in and near the tract during mining and on long term water quality. Two stock wells would need to be redrilled to about the premine depth. Water levels in about seven wells in the vicinity of the tract would be very much reduced and possibly could go dry during mining. Flow into the pit during mining would be medium among the tracts, preliminarily estimated at 5,000 cu ft/day with an adequate stream buffer (Cannon 1980).

Following mining, water quality at the depth of the Knobloch coal seam and above in the vicinity of the mine would be degraded by increased salinity. The impact would be long term but the degree is unknown. However, the water would be useable for stock but would be even more marginal than the poor water currently used for household purposes.

2. Surface Water

The effects of coal strip mining on surface water would be minor. The ground water flow directly into Otter Creek would not be disturbed by mining because most of the contributing area is burnt coal. Increased ground water salinity flowing into the smaller creeks would be well diluted by the time it reaches Otter Creek. Sediment yields can be considered to be proportional to soil erosion losses discussed in the soils section.

3. Alluvial Valley Floors and Flood Plains

Since ground water flows directly into Otter Creek would not be disturbed by mining the tract, no impact on its alluvium would occur.

F. VEGETATION

If the range is in excellent condition (100-76%) there would be an approximate loss of 962 to 690 AUMs. However, in its present condition, there would be a loss of approximately 606 AUMs.

Reestablishment of native vegetative communities depend upon climatic conditions, species diversity and reclamation technique.

The reclamation process for the iitial cut would probably be delayed for 2-3 years dependent upon the mining operation. When th mining operation gets into a cut-and-fill situation then the reclamation process would start. Provided there is adequate vegetation present on the reclaimed land, grazing would start after the sixth or seventh year on the initial 84-acre cut and approximately in the fifth year after the mining process becomes a cut-and-fill operation. As mining proceeds in different areas of the tract, not all of the land is utilized for mining at any one time and grazing could occur on portions of the tract.

Mining of the area would temporarily eliminate opportunities for domestic livestock to occupy the surface and to utilize the forage. However, vegetative production may be better after mining (due to extensive reclamation work) and the area may produce more than the current number of AUMs per acre. There is, however, no evidence that the plant community that ultimately evolves would support higher levels of livestock grazing than the premining vegetation supported.

Additional impacts resulting from vegetation disturbances would be (a) possible reduction of the visual aesthetics, (b) increased soil erosion, and (c) reduction in the amount of wildlife and livestock forage.

The Office of Surface Mining assures that the mining company establishes a diverse, effective and permanent vegetative cover to standards set by the Montana Department of State Lands and the federal Bureau of Land Management.

G. LAND RESOURCES

1. Agriculture

The proposed action would have a significant impact on agriculture in the tract (see Table 3-3). By the end of mine life, 3,346 acres would be disturbed, including 227 surface acres used for haul roads.

Impacts on agriculture include displacement of 637 acres (13 acres subirrigated and 624 acres non-irrigated) of class III and IV privately-owned land that would produce, on the average, 857 tons of alfalfa and 637 AUMs or 12,623 bushels of wheat per year.

a. Economic Impacts on Agricultural Sales Activity

Assuming, for analytical purposes, a ranch output figure of $280 (LLS = lost livestock sales) per cow/calf unit and using 12 AUMs or 0.4 tons of hay per AUM as the forage

requirement of, respectively, a cow/calf pair[1/] or cow/heifer with calf in utero[1/], we have (assuming a five-year disturbance cycle):

$$LLS = \$280 \left(\frac{.125 \text{ minewide AUMs}^{2/}}{12} + \frac{.125 \text{ minewide tons of hay}^{2/}}{(12)\quad(0.4)}\right)$$

Based on the formula above, the loss of ranch output (LLS) due to mining of Coal Creek in would be about $9,900 per year (at peak disturbance). The loss of secondary income dependent on ranch output (wages and profits in business/government(s) which supply or depend on agriculture) would be $15,600 per year.

b. Off-site Impacts

Hay meadows near Ashland worth $41,200 in annual output (LLS) and supporting $65,000 of annual secondary income would be (irrevocably) lost due to urbanization.

c. Total Impacts

Total agricultural output losses (LLS) of $51,100 per year place this EMU low in order of agricultural impacts. Net national product foregone on the tract is $4,800 and off-site product drop would be $75,200.

d. Rancher Perspectives On Economical Social Impacts

All of the four landowners in the Coal Creek EMU were contacted. The largest landowner had 51% of the land in the EMU. The smallest had 19% of the EMU acreage. None of the landowners felt he would suffer a net economic hardship while two felt they would benefit economically with mining. One rancher saw no significant change in operating income with or without mining. Consistent with the fact that half ajority of the operators (2 of 4) felt

1/ A fully allocated cow/calf pair (ccp) or cow/heifer with calf in utero (ccu) includes the amount of forage needed to sustain the ccp/ccu.

2/ Using a 5-year disturbance period over the 40-year mine life, .125 of the forage would be lost at peak disturbance.

they might benefit economically, none of the landowners felt felt he would suffer a lowering of his level of quality of life. One felt his quality of life would improve, one foresaw no change. None of the ranchers was adamantly opposed to development. In fact, two ranchers favored development of coal mining.

2. Recreation

No significant long-term impacts are expected to occur on the tract. Some secondary impacts would occur. Overall recreational demand on federal and private lands would increase due to population increases and the construction or relocation of roads at the mine site might improve legal and/or physical access to some areas. These increases would probably reduce levels of recreation enjoyment due to increased crowding, litter and pollution at and near developed recreation sites.

3. Other Land Uses

Impacts on land use would be relatively minor but highly concentrated. Industrial activities would be introduced into an area of no previous actvity and with no ability to support mining without construction of major facilities and improvement of existing transportation routes. The existing ranching and wildlife uses of the tract would be displaced for the life of the mine but would again be possible after reclamation. The mine will disturb 3,346 acres plus additional offsite acreages for roads, railroads, and utilities. Assuming respective rights-of-way widths of 150, 200, and 60 feet, the additional disturbed area would total 302 acres for relocation of 0.75 mile of U.S. 212, a two-mile rail spur from the proposed Tongue River Railroad, and a minimum 33-mile powerline route from Colstrip.

Changes in the land from these mine-related uses would be mostly temporary and insignificant after reclamation.

The existing road system would have to be extensively upgraded with roads to the site. Problems associated with this include increased trespass, vandalism, litter, and fire hazard potentials. The railroad spur may eventually encourage additional industrial development of the area. Increased road and rail traffic also increases the potential for more accidents because of greater exposure. The impacts would cease at the end of mining if unnecessary transportation corridors are abandoned and reclaimed; however, this type of land use commonly remains longer than the activity it serves.

H. WILDLIFE

The impacts upon wildlife habitats and populations are summarized in the matrix (appendix). Impacts are rated for the projected 40-year life span of the mine. By maintaining the one exclusion area for sharp-tailed grouse, no arena would be lost. If the exception is applied as stipulated, all areas would be disturbed at some time in the life of the mine. Careful management would minimize the impacts on the sharp-tailed grouse population.

Habitat lost to mining will displace up to 40 antelope from a winter concentration in sections 8 and 9, T3S., R.45E. All or portions of suitable deer and antelope habitat would be disturbed during the life of the mine. The availability of similar habitat on the adjacent Custer National Forest would help to minimize the displacement impacts.

Habitat for non-game birds, mammals, and reptiles would be lost during mining. No estimate of numbers displaced is known, but it is felt it would be low, based on the availability of similar adjacent habitat.

Mining would disturb the hunting territory related to the golden eagle nest south of the EMU. The extent of the disturbance is not known as the actual territory has not yet been delineated.

Increased human presence in the area would increase the number of game and non-game birds and animals killed by vehicular accidents and illegal hunting activity. No estimate of this impact can be made at this time.

I. CULTURAL RESOURCES

All sites within the tract boundaries would be subject to direct impact from mining activities. Other direct impact is predicted to sites not previously located from construction of facilities, transportation corridors, powerline corridors and mining activities, resulting in damage and destruction of sites and their immediate environmental context. Sites not subject to immediate direct impact would be indirect impacted from increased erosion, access and vandalism.

Cultural resources buried by colluvial and alluvial deposition, and not previously located in surface inventory, would also be destroyed. Should the tract be leased, an inventory and mitigation program would be undertaken for all cultural resources in the tract. If avoidance and preservation alternatives are not feasible, a scientific program of data retrieval will be developed and implemented.

J. VISUAL RESOURCE MANAGEMENT

Mining would completely change the character of the tract. Visual impacts would increase in the form of land disturbances due to the mines, roads, railroads, and utilities. Changes to the topography, vegetation and scenic quality would occur. Currently, there are no industrial influences in the area, so the contrast would tend to be extreme. Along with this, some decrease in visibility would occur from dust and vehicle emissions. Overall, adverse impacts would be moderate during mining because the mine would be readily visible from U.S. 212. The topography would not be significantly altered after reclamation. There is some above average, "Class B", scenery which would be affected, but due to the location, these visual impacts would be experienced only by persons traveling the highway. Generally, the visual impacts would be about the same as those of other mines in the region. All of the impacts would either cease or be reduced to very low levels when mining ends and reclamation is completed.

K. ECONOMICS

1. The Coal Creek tract would support a mine employing about 123 operations workers. If the mine were open in 1985, employment would peak at 221 workers (some construction and operations workers would be there simultaneously). This would induce the creation of 30 secondary jobs in Rosebud County between 1985 and 1990. By 1990 mine employment would fall by 98 workers. The total 1990 (primary and secondary) employment with Coal Creek would be 153 above what it would have been without the development.

2. Cost of Living Implications* - For Ashland Area Mines Only

Growth in the Ashland area will probably result in significantly higher cost of living with increased housing costs

Literature: Wallwork, Susan Selig, Maxine C. Johnson and Paul E. Polzin. Housing Needs and Preferences: A Survey of Montana Households. University of Montana, Missoula, Montana. 1979.

*Montana Power has contracted for much of the capital additions in Colstrip.

+State Senator Tom Towe, personal communication, December, 1980. The exact wording of the bill is not yet known but areas like Colstrip and Ashland would be encouraged to incorporate.

contributing most to overall increased cost of living. While it is not possible to state exactly how many people will be directly affected, a recent study (University of Montana 1979) indicates that about three in every ten eastern Montana households had low or fixed income (less than $10,000 per year-1978 dollars) and 17% of the households are headed by persons of retirement age (65 and over). If housing cost increased by 25%, then units which, in 1978, cost from $150 to $199 per month, would increase to from $187 to $248 per month. The University of Montana study found that 49% of those buying their homes in Eastern Montana and 79% of those renting paid $199 per month or less and that about 23% of all households felt they could not afford to pay more than $199 per month for shelter. As increases in housing costs of 25% are likely (see Appendix D of the Regional paper "The Economic Setting of Southeast Montana") it is likely that nearly three of every ten households confronting the higher housing costs will be low or fixed income households, that about one in every six will be a household with a household head of retirement age and that two of every nine households will have difficulty adjusting to the higher housing costs.

3. Fiscal Impacts

Coal Creek would, along with Ashland (Decker-Birney) and Southwest Otter Creek, have the highest level of fiscal impact. Ashland, unlike Colstrip, is not being provided community capital additions (schools water, sewer, etc.) by a sponsor.* A prefiled bill, LC 181,+ would, if passed by the Montana Legislature, encourage areas like Ashland and Colstrip to incorporate to receive Coal Board assistance. Ashland, if it incorporates, would be at a relative disadvantage to Colstrip and Spring Creek (new town) as the other communities would already have made much of their capital investment before incorporation.

Development of a Coal Creek mine would result in more population in Rosebud County without any compensating increase in mine-based revenue (all coal production and taxes paid in Powder River County).

L. SOCIOLOGY

1. Population

The population affect of a Coal Creek mine is shown in Table 3-4. All of the assumptions stated in Chapter II apply here.

With a Coal Creek mine, Ashland's population increase would be 151%, including the MONTCO mine, over the decade of the 80s.

These population figures should be seen as heuristic. They are based on many simplifying assumptions. Not only are the figures based on the assumption that growth rates will remain the same, but that the incoming population will actually settle where it is suggested here.

2. Community Services

The community services in Ashland that will likely be the most severely impacted are medical, housing, and recreation (Williams, 1975; Murdock, Leistritz, and Schriner, 1980). Other services and institutions that will be affected are the schools and the criminal justice system.

3. Attitudes

The impacts of development on social attitudes cannot be assessed until after development has occured. There is no way to estimate what changes, if any, in attitudes would occur.

4. Changes in Ashland Community Structure

Given the increase in population to Ashland, the community can be expected to change along the following dimensions. First, increase in population from mineral development will result in a more heterogeneous community which, in turn, generates varying degrees of community conflicts (Albrecht, 1978; Cortese, 1980; Murdock and Leistritz, 1979). Secondly, community interaction will tend to become more formal due to the increase in bureaucratization (more aspects of everyday life become handled in and through bureaucracies). Thirdly, the longtime residents may lose some of the sense of community they had before development.

In terms of the polity, more decisions that affect the community will be made by extra-local sources.

Finally, it must be noted that many of these changes, such as extra-local control and increasing bureaucratization, are occurring in rural communities like Ashland without development (Vidich and Bensman, 1968; Warner, 1974; Warren, 1978); the impacts of coal development just hasten these changes.

M. AIR QUALITY AND NOISE

The present noises and odors would dramatically change from natural to industrial origins as heavy mining equipment, rail and road traffic and explosives use are begun or increased from present levels.

Impacts

Climate and Air Quality

Controlled particuate emissions for this mine would range from 536 to 571 tons/year during full production. This would result in a maximum particualate concentration increase of about 5 micrograms per cubic meter in 1990. With a background concentration of 20 micrograms per cubic meter Annual Geometric Mean (AGM), the highest arbical concentration would be 23 micrograms per cubic meter (State standard: 75 micrograms per cubic meter). At distances greater than 1.0 miles from the mine boundary, the increase particulate levels would drop below 1 microgram per cubic meter above hard ground. The second highest 24-hour particulate concentration, including hardground, would be 36 micrograms per cubic meter (State standard: 200 micrograms per cubic meter).

III. SHORT-TERM VERSUS LONG-TERM IMPACTS

A. SHORT TERM

Production through life of mine is estimated at 164 million tons of coal. The tract would be temporarily commtted to a single use that would in turn impact other potential uses.

Short-term impacts on wildlife from mining of the Coal Creek tract are summarized. The one sharp-tailed grouse arena and the surrounding nesting habitat would be lost. Up to 12 antelope would be displaced from their summer range and up to 40 antelope would be displaced from a winter range. Approximately 10 mule deer would be displaced from year-long habitat. A golden eagle nest would possibly be disturbed and an unknown quantity of hunting territory would be disturbed by mining. Habitat for non-game birds, mammals and reptiles would also be lost in the short term. An undetermined number of birds and animals would be killed by vehicular accidents and illegal hunting activity due to the increased human population during the life of the mines.

B. LONG TERM

Evidence of mining and reclamation would remain in the form of less contrasting topography and an alteration of soil texture and porosity.

Long-term impacts on wildlife would be dependent on the success of reclamation. If shrubs and ponderosa pine cover cannot be restored, the vegetative diversity of the area would be decreased.

This decrease in the vegetative diversity would also decrease the variety of birds and animals currently found in the tracts.

IV. IRREVERSIBLE AND IRRETRIEVABLE

The coal removed by mining and that left by current recoverable techniques would be lost from future use.

V. NET ENERGY ANALYSIS

A net energy analysis was calculated using the guidance contained in BLM-Washington Office Information Memo 79-2892, August, 1979. Approximately 38 British thermal units (BTUs) would be expended to produce a pound of coal. That pound of coal, in turn, would produce about 8,462 BTUs. The ratio of energy produced to that expended is over 225 BTUs/1 BTU.

The net energy relationship (ratio of energy produced to energy consumed) for the Ashland Coalwood EMU is 320 to 1.[1]

[1] Based on the Btu value per pound of coal as given in the tract delineation reports and on an average input energy value of 25.6 Btu's of energy consumed for each pound of coal produced (average of the energy consumption of the Decker mines as described by USGS in a 1977 EIS and the WECO area B expansion as described by the Montana Department of State Lands in a 1978 EIS). Only direct energy consumption was considered (the ratios shown do not contain any estimate of energy used in transporting the coal from the mine to the demand center).

TABLE 3-4

From a Coal Creek Mine,
And Ashland Total Population 1980-1990

Year	Additional Population to Ashland From A Coal Creek Mine [a]	Ashland Total Population[b]
1980		569
1981		589
1982		657
1983		1,205
1984		1,182
1985	118	928
1986	101	1,053
1987	102	1,204
1988	-118	1,274
1989	0	1,400
1990	0	1,427

[a]Includes construction, operational and secondary workers

[b]Includes the projected growth ONTCO mine population from Table 2-2, Chapter II

[c]Ba sed on geometric growth of Broadus using a rate of annual increase of -.0111

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Soils	There are 22 soil series in the tract mapped at level two and level three in a survey done by the Soil Conservation Service, which are found along rolling uplands and steep-sided gullies.	There will be displacement of soil by water and wind erosional forces; change in soil structure and natural fertility and significant problems in revegetation and stabilization on steep slopes.	Significance of the impact will be high. Reconstruction potential is rated as 94% poor and suitability of soil material for reclaimability is rated as 32% poor and 43% unsuitable	Data reliability is 30% from the Powder River County Area Soil Survey and 80% from the Rosebud County Soil Series Descriptions and Interpretations. Better Soils in the bottomlands are more accurately mapped than those on the rangelands and steep-sided slopes.	The overall view of the Tract for reconstruction potential is lower than what it actually is because of the low reliability of the Powder River County Area Soil Survey.
Water Resources Ground Water Use in Tract	2 stock wells are in use in the tract.	Wells would need to be redrilled, if needed, after mining.	Minimal cost for mining company to redrill well	Good	
Quantity	Sawyer coal is dry Knobloch coal is saturated. Natural flow is estimated at 5,000 cu ft/day and follows the topography.	Water will flow into the mine pit at the given rate. About 7 wells would be affected during mining outside the Tract.	Significant during mining.	Fair-good	
Quality	TDS for Tract is unknown but averages about 2,500 mg/L for the area.	Increase in salinity of wells in the vicinity of mine in and above Knobloch coal seam will occur. Water would still be useable for stock but would be more marginal than existing for household use.	Significant, long term	Fair	More research is needed to predict quantitive changes in post mining quality.
Surface Water Quantity	No major creeks impacted directly.	Very slight reduction of surface runoff during mining. Possible slight effect after mining.	Very minor.	Good	

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Quality	No major creeks impacted directly. Sediment yields are estimated at 0.0-1.2 ac ft/sq mi/yr.	Sediment yields would be proportional to soil erosion losses.	Minor	Good	
Alluvial Valley Floors and Flood Plains	Otter Creek is a possible AVF but is out of the Tract.	Mining of Tract would have little direct effect on the alluvium of Otter Creek.	Insignificant	Fair-good	
Agriculture	There are 1186 acres of Class II, III and IV land in the tract that is currently being cropped. The subirrigated lands are found in the bottomlands. The balance of the land is found adjacent to the bottomlands.	There will be displacement of lands currently being cropped and suitable for cropland.	It will reduce the 108 acres of cropland for a 11 year period. This alfalfa hay production would be reduced by 270 tons for each 108 acres per year as long as out of productions which would be a minimum of 5 years.	Data reliability is 30% from the Powder River County Area Soil Survey and 80% from Rosebud County Soil Series Descriptions and Interpretations, prepared by the Soil Conservation Service Better soils in the bottomlands are more accurately mapped. The balance of the soils tend to be better than mapped.	

COAL CREEK

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Quality	No major creeks impacted directly. Sediment yields are estimated at 0.0-1.2 ac ft/sq mi/yr.	Sediment yields would be proportional to soil erosion losses.	Minor	Good	
Alluvial Valley Floors and Flood Plains	Otter Creek is a possible AVF but is out of the Tract.	Mining of Tract would have little direct effect on the alluvium of Otter Creek.	Insignificant	Fair-good	
Agriculture	There are 1186 acres of Class II, III and IV land in the tract that is currently being cropped. The subirrigated lands are found in the bottomlands. The balance of the land is found adjacent to the bottomlands.	There will be displacement of lands currently being cropped and suitable for cropland.	It will reduce the 108 acres of cropland for a 11 year period. This alfalfa hay production would be reduced by 270 tons for each 108 acres per year as long as out of productions which would be a minimum of 5 years.	Data reliability is 30% from the Powder River County Area Soil Survey and 80% from Rosebud County Soil Series Descriptions and Interpretations, prepared by the Soil Conservation Service Better soils in the bottomlands are more accurately mapped. The balance of the soils tend to be better than mapped.	

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Vegetation Rangeland types Ponderosa Pine Savannah	EMU Acres Grassland 1331 Sagebrush-grassland 416 Ponderosa pine 462 Other 637 3346	Grassland High Sagebrush-grassland High Ponderosa pine High Other Low	High - - - - Long term elimination of the natural vegetation mosaic and species diversity	Good	Reclamation of Ponderosa pine not yet proven.
Animal Unit Months (SVIM)	606 AUMs	High	Loss of 606 AUMs High	Good	
Animal Unit Months If Range is in Excellent condition 100-76%	962 to 690			Good	
Threatened Endangered or Noxious species	There are no threatened or endangered plant species found growing in the EMU. However, there are six noxious species found growing in the Powder River Resource Area, but it has not been determined if these species are found growing in the EMU. The species are: A. Convolulus aruensis B. Cirsium arvense C. Euphorbia esula D. Centaurea ropens E. Cardaria draba F. Centaurea maculosa	Low	Low	Good May 16, 1980 Regional Director Region 6 U.S. FWS Denver, Colorado	

ELEMENT	PRESENT SITUATION		ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Reclamation-Vegetation	On Federal, State and Private lands, the Office of Surface Mining (OSM) assures that the mining company establishes a diverse, effective and permanent vegetative cover to standards set by the Department of State Lands of Montana and the Federal Bureau of Land Management.		Low	High-failure of Reclamation Low-success of Reclamation	Good	
Wildlife Habitat	Acres	% of Total	Year 2026			
Grassland	1331	40	Low negative	Low negative	Good	
Sagebrush-grassland	916	27	Moderate negative	Low negative	Good	
Ponderosa pine	462	14	High negative	High negative	Good	Reclamation of Ponderosa pine not yet proven.
Other	637	19	Low negative	No Change	Good	
Population	Level of Use					
Sharp-tailed grouse	High		Moderate negative	Low negative	Good	
Mule Deer	Average		Low negative	Low negative	Good	
Antelope	Average		Low negative	Low negative	Good	
Golden Eagle	Average		Low negative	Low negative	Good	
Other Raptors	Average		Low negative	Low negative	Good	
Non-game birds and mammals	Average		Low negative	Low negative	Good	
State species of special interest or concern	Low		Low negative	Low negative	Good	
Reptiles and Amphib	Average		Low negative	Low negative	Good	
Threatened or Endan	None Occur		——	——		

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Cultural Resources	1033 acres over Federal coal inventoried in two surveys (Davis 1976; Bryant, Kollefson, Gehr 1980). Three prehistoric lithic scatters, one historic site of undetermined function (buildings and farm machinery) 18 isolated artifacts recorded. Three sites are believed to be eligible for nomination to the National Register based on consultation with the Montana SHPO.	Direct impact to all sites within tract boundaries.	Destruction of sites, their immediate environmental context, and their scientific and historical information. Reduction of the present finite, non-renewable resource base.	Good	Best estimate of site density is for Ashland-Coalwood tract as a whole. (4.5 ± 1.15 sites/square mile at 95% confidence).

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Recreation	No development or known use of the area. Very limited use may occur. Hunting by permission of landowner. No public access exists.	None. No recreation functions are planned for the area and legal access does not exist.	Virtually none on the short term. No effect on a long term basis.	Poor.	Recreation data is virtually non-existent.
Wilderness	No wilderness potential within or near area.	None.	None.	Excellent.	Wilderness inventory complete and area eliminated from consideration.
VRM	Open air, agricultural environment. Area visible from U.S. Highway 212. Low mountains, forested hills, some breaks. Scenic quality classes B and C, with roughly equal amounts of each.	Disturbance of landforms and natural scene. Some activities visible from U.S. Highway 212.	Moderate during mine life. Low after reclamation.	High.	Very difficult to mitigate impacts while mining is occurring.
Noise Air Quality	Natural sounds prepreva-lent. Some noise from vehicles and farm machin-ery.	Severe intrusions of heavy equipment. Construction and use of rail system. Use of explosives. Increased traffic on U.S. Highway 212.	Quite severe during mining. Impact would cease when mine is closed.	Excellent.	Impossible to mitigate during mine life.

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT	DATA RELIABILITY	COMMENTS
Transportation:					
Employee	Existing access by gravel or dirt roads. Low use and maintenance.	Increased traffic on US 212, Otter Creek and Tongue River roads. Potential for more accidents. Improvements to roads.	Moderate on all accounts during mining. Very low after mines close.	Good.	Road improvements should contribute to safety after mining traffic ceases.
Product	Roads inadequate for transport. No rail system near area.	Improvements to roads. Construction of roads. Construction of railroad. Rail traffic introduced to area. Increased hazards. Increased surface disturbance	Moderate. Moderate. Possibly high. Possibly high. Moderate. Low.	Good for all items.	
Land Use	No industrial activity. Some farming. Ranching is primary use.	Introduction of industrial activities. Land required for mines, roads, railroads, powerlines.	Moderate during mining. Low to none after reclamation.	Good.	Existence of power and rail lies may encourage further development of area.

Soils
Coal Creek

References

U.S. Department of Agriculture, Soil Conservation Service. "Soil Series Descriptions and Interpretations."

U.S. Department of Agriculture, Soil Conservation Service, Soil Survey Staff. "National Soils Handbook."

U.S. Department of Agriculture, Soil Conservation Service. "Soil Survey - Powder River County Area, Montana." 1971.

U.S. Department of the Interior, Geological Survey and Montana Department of State Lands. "Draft Environmental Statement Regional Analysis, Northern Powder River Basin Coal, Montana." 1979.

Water Resources

References

Knapton, J.R. and McKinley, P.W. Water Quality of Selected Streams in the Coal Area of Southeastern Montana. USGS Water Resources Investigations 77-80, Helena, MT. 1977.

USGS. Water Resources Data for Montana. USGS Water - Data Report MT-78-1, Helena, MT. 1979.

Water Resources

Consultation

Cannon, Mike. USGS-WRD, Helena. Otter Creek Area Ground Water. (Phone conversation.) H.H. Davis, Hydrologist, Miles City District Office, December 1980.

Cultural Resources

References

Bryant, R., Gehr, E., and Rollefson, G. Analysis of Methodological Goals, Site and Isolated Artifact Summary Tables, Otter and Hanging Woman Creeks, Class III Cultural Resource Inventory.
Eugene, Oregon: Professional Analysts (Prepared for the Bureau of Land Management, Contract no. YA-512-CT9-250). 1980.

Davis, Carl M. A Preliminary Archaeological Reconnaissance Survey, Bureau of Land Management Lands, Southeastern Montana
Missoula, Montana University of Montana (Prepared for the Bureau of Land Management, Contract no. 52500-CT5-1100). 1980.

References

Hickey, W. C. Sr. A Discussion of Grazing Management Systems and Some Pertinent Literature. U.S. Department of Agriculture, Forest Service 1969.

Hunter, H. E., R. L. Ross. Climax Vegetation of Montana. U.S. Department of Agriculture, Soil Conservation Service. 1976.

Payne, G. F. 1973. Vegetative Rangeland Types in Montana: Bozeman, Montana Agricultural Experiment Station, Bulletin 671. 16 p.

U.S. Department of Agriculture, Soil Conservation Service. Technicians Guide Section II-E-3 Range Site Criteria. 1972.

U.S. Department of Agriculture, Soil Conservation Service. Rosebud and parts of Big Horn County, Advanced Material Subject to Review and Approval. March 1977.

U.S. Department of Agriculture, Soil Conservation Service. National Range Handbook. 1976.

U.S. Department of Agriculture, Soil Conservation Service. Technicians Guide IIE. Range Site Criteria. 1972.

U.S. Department of Agriculture, Soil Conservation Service. Climax Vegetation of Montana. 1976.

U.S. Department of Agriculture, Soil Conservation Service. Technicians Guide Section II-E-3 Range Site Criteria. 1973.

U.S. Department of Agriculture, Soil Conservation Service, U.S. Department of Interior, Bureau of Indian Affairs, and Montana Agricultural Experiment Station. Soil Survey of Big Horn County Area, Montana. Issued 1977.

U.S. Department of Agriculture, Forest Service and Soil Conservation Service, U.S. Department of Interior, Bureau of Land Management and Montana Agricultural Experiment Station. Soil Survey of Powder River Area, Montana. Issued 1971.

U.S. Department of Interior, Geological Survey and Montana Department of State Lands. Northern Powder River Basin Coal. Montana. 1979.

U.S. Department of Interior. Bureau of Land Management. Soil Vegetation Inventory Methods. 1979.

U.S. Department of Interior, Bureau of Land Management Forage Requirements Range Workshop. Albuquerque, New Mexico. 3/13/80.

Wildlife Management Institute. If Deer Are to Survive. Stackpole Books, Harrisburg, PA 1971.

Vegetation
Coal Creek

Consultation

Hemmer, D., Montana Dept. of State Lands. 1980.

Coenenberg, J. Vegetation Specialist, Western Energy Company, Colstrip, Montana. 1980.

Wildlife

References

Martin, Peter R. "Terrestrial Wildlife Habitat Inventory in Southeastern Montana." USDI/BLM and Montana Department of Fish, Wildlife and Parks. November 1980.

Montana Department of Fish, Wildlife and Parks. Big Game Survey and Inventory (Deer and Antelope) and Upland Gamebird Inventory (Region 7). Helena, MT June 1980.

U.S. Department of Interior, Bureau of Land Management. Powder River Resource Area, Management Framework Plan Amendments. Miles City, Montana. June 1980.

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225